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Surveillance Center RDT&E Division

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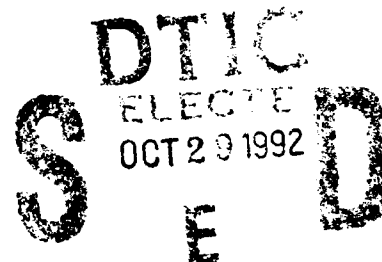


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Technical Document 2256
August 1992

Interface Control Drawing for JTIDS DDG-69 Shipboard Antenna Revision A

Dr. S-Y. Shih
R. Cozad



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Interface Control Drawing
for JTIDS DDG-69
Shipboard Antenna

Revision A

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**NAVAL COMMAND, CONTROL AND
OCEAN SURVEILLANCE CENTER
RDT&E DIVISION
San Diego, California 92152-5000**

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1.0 SCOPE

This Interface Control Drawing (ICD) establishes the mechanical and electrical interface requirements and procedures necessary to install and integrate the Full-Scale Development (FSD) Joint Tactical Information Distribution System (JTIDS) shipboard antenna on a DDG-69 AEGIS class ship. This ICD will be periodically updated as the interfaces are refined in order to provide a common data reference.

2.0 APPLICABLE DOCUMENTS

2.1 GOVERNMENT DOCUMENTS

The following documents of the issue shown below are a selected listing governing requirements for the JTIDS antenna.

2.2 SPECIFICATIONS

MIL-STD-2036	General Requirements for Electronic Equipment Specification
MIL-C-39012	Rev. C, 30 September 1982, General Specification for Connectors, Coaxial, Radio Frequency

2.3 STANDARDS

MIL-STD-1310	Rev. E, 18 August 1987, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety
MIL-STD-889B	Dissimilar Metals, 7 July 1976

2.4 TECHNICAL MANUALS

SPAWAR 0967-LP-627-3000	Change 3, 4 September 1985, Technical Manual, Operation and Maintenance Instruction, Antenna Group OE-273(V)/URN and OE-273A(V)/UR
NOSC TD 1283A	Interface Control Drawing for JTIDS Shipboard Antenna

2.5 DRAWINGS

TBD

3.0 INTERFACE REQUIREMENTS

3.1 MECHANICAL INTERFACE

3.1.1 Item Definition

JTIDS DDG-69 antenna is a collinear array developed by CHU Associates, El Cajon, California. There are two types of antennas used on the DDG-69 class system. There are two receive antennas—Directive Array Antenna, Model No. AS-4310/URC-107(V) and one transmit antenna—Omni Antenna, Model No. AS-4309/URC-107(V). The JTIDS DDG-69 antennas operate over the entire JTIDS frequency band (960 MHz to 1215 MHz) without electrical or mechanical tuning. Figures 1 and 2 illustrate the mechanical overview of each antenna. Figure 3 illustrates the suggested mounting plate.

3.1.2 Dimensions

The shipboard antenna envelopes and mounting configurations are illustrated in figures 5 and 6.

3.1.3 Weight

The total weight of the JTIDS Transmit and Receive Shipboard Antennas does not exceed 18 pounds.

3.1.4 Mounting

The transmit antenna, model number CA3532, is located 8 feet above the 010 level and 10 feet from the pole mast on the port side. Two receive-only antennas, model number CA3627, are located beneath the ends of the yardarm at the 07 level (figure 7). The supporting structures for these antennas are TBD.

3.1.4.1 Mounting Plate. Although figure 3 is a suggested mounting plate, an alternative method is allowed if it meets ship safety requirements.

3.2 ELECTRICAL INTERFACES

The electrical interfaces between the DDG-69 shipboard antennas and the JTIDS terminal are shown in figure 4 and are defined in the following paragraphs. Cable running sheets for JTIDS are shown in figure 8.

3.2.1 JTIDS Electrical Interfaces

The JTIDS electrical interfaces, three coaxial transmission lines, connect the DDG-69 antennas to the JTIDS shipboard class 2 terminal. One coaxial line connects the transmit antenna to port 2J2 of the notch filter assembly (NFA) of the terminal. The other two lines connect two receive-only antennas to ports 1J2 and 1J3 of the terminal. The coaxial

lines shall be connected to the antennas by the installing activity using standard shipboard exterior cabling practices. The antennas are fitted with bulkhead connectors appropriate for mating with the JTIDS RF power cable connectors, Type N and designated J1 for this electrical interface.

3.2.2 Cables

The installing activity shall be responsible for RF cables (see section 3.2.6.1.e and 3.2.6.2.e) and for antenna mounting. Cable loss for transmit or receive antennas shall not exceed 2 dB. If a combination of cable type LDF5-50A (1.33-dB/100 ft cable loss) and RG-214/U (8-dB/100 ft loss) for flexibility is used, a length of 141 ft and 1.5 ft respectively will meet the 2-dB constraint.

3.2.3 Electrical Connectors

The JTIDS DDG-69 antennas do not require electrical connectors.

3.2.4 RF Coaxial Connectors

The antenna connectors shall conform to sections 3.2.6.1.f and 3.2.6.2.f.

3.2.4.1 RF Coaxial Connection Procedure. To connect Type N plug to Type N jack, remove the 7/16-inch upper bolt/nut pattern on antenna. Install cable (RG-214/U) through center hole of fixture, then fasten. Reassemble antenna to fixture by using bolt/nut pattern just removed.

3.2.5 DDG-69 Antenna Performance Characteristics

3.2.5.1 Transmit Antenna, CA3532, Performance Characteristics

ELECTRICAL

Frequency	960-1220 MHz
Polarization	Vertical
Impedance	50 ohms
VSWR	2.0:1 maximum
Gain	2.5 dBi minimum
Azimuth Coverage	Omnidirectional within ± 0.5 dB
Zenith Coverage	
Beamtilt	5° nominal
Half-Power Beamwidth	55° minimum 65° nominal
Power Rating	Peak 1 kW, Average 300 W
Input Connector	Type TNC receptacle

ENVIRONMENTAL

Vibration	MIL-STD-167, Type 1
Wind	100 knots, maximum, with 4.5 lbs/sq. ft. ice load
Temperature/Humidity	MIL-STD-2036

3.2.5.2 Receive Antenna, CA3627, Performance Characteristics

ELECTRICAL

Frequency	960-1220 MHz
Polarization	Vertical
Impedance	50 ohms
VSWR	2.0:1 maximum
Gain	6.0 dBi minimum
Azimuth Coverage	180°
Zenith Coverage	
Half-Power Beamwidth	55° nominal
Power Rating	Peak 1 kW, Average 300 W
Input Connector	Type TNC receptacle

ENVIRONMENTAL

Vibration	MIL-STD-167, Type 1
Wind	100 knots, maximum, with 4.5 lbs/sq. ft. ice load
Temperature/Humidity	MIL-STD-2036

3.2.6 Signal Definition

The JTIDS DDG-69 antennas provide RF interfaces for all transmitted and received JTIDS signals on the JTIDS-equipped DDG-69 ship. Figure 8 shows the respective Cable Running Sheets for JTIDS.

3.2.6.1 JTIDS Transmit Antenna (RF) (J1)

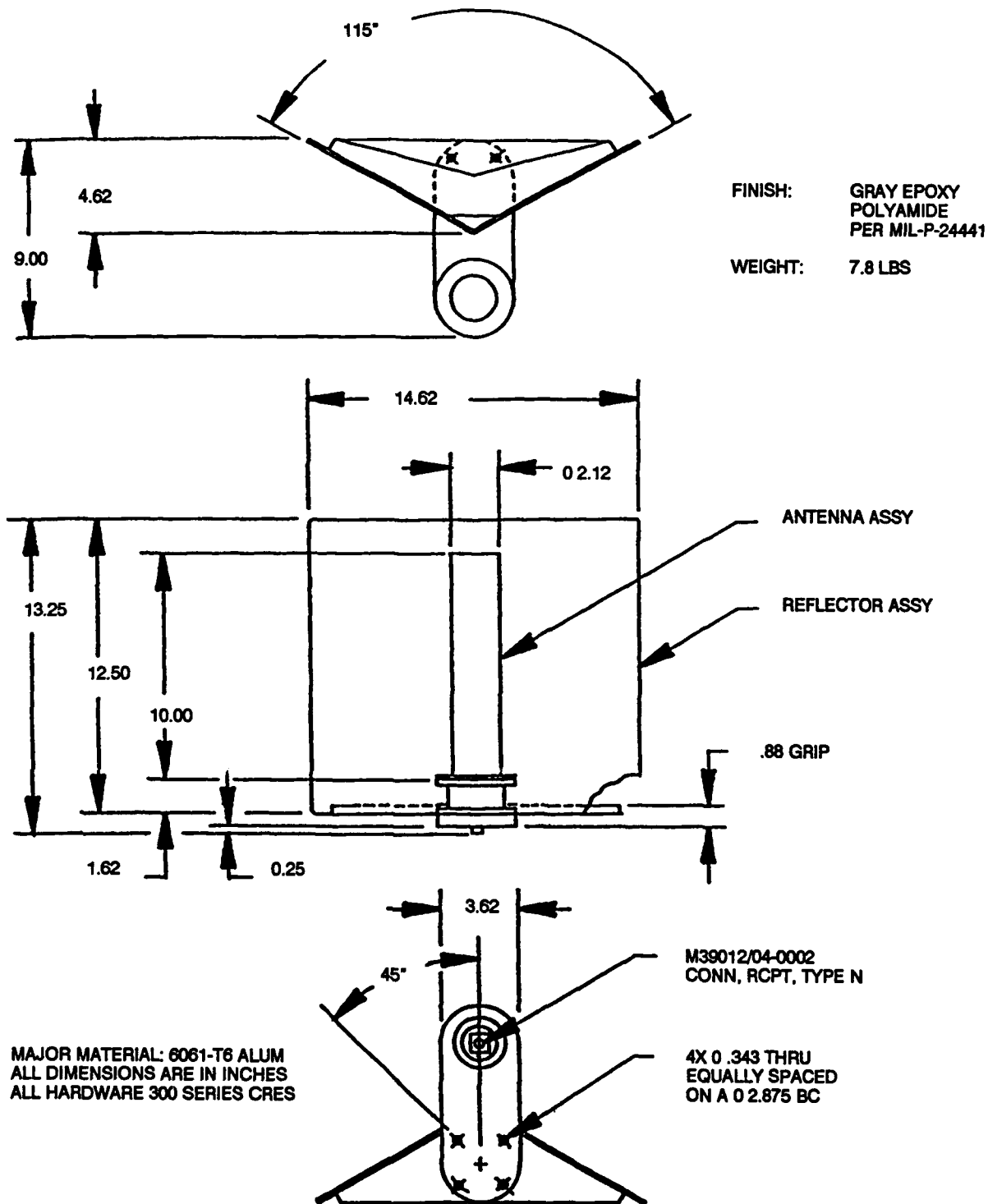
- a. Signal Name: JTIDS RF Power (Transmit)
- b. Signal From/To: JTIDS Notch Filter Assembly to Antenna
- c. Signal Function: Transmission of JTIDS RF Pulses

d. Signal Characteristics:

- Type: RF Pulse, Unbalanced Coax
- XMIT Amplitude: (a) 200 W (Low-Power Mode)
(b) 1000 W (High-Power Mode) (at 20% Duty Cycle)
- Frequency Range: 960-1215 MHz
- e. Cable Type: (a) Andrew LDF5-50A
(b) RG-214/U
- f. Connector Type: (a) Andrew L45N and L45W
(b) M39012/01-0005
- g. Load Impedance 50 Ohms, nominal
- h. Voltage Standing Wave Ratio: 2.0:1

3.2.6.2 JTIDS Receive Antenna (RF) (J1)

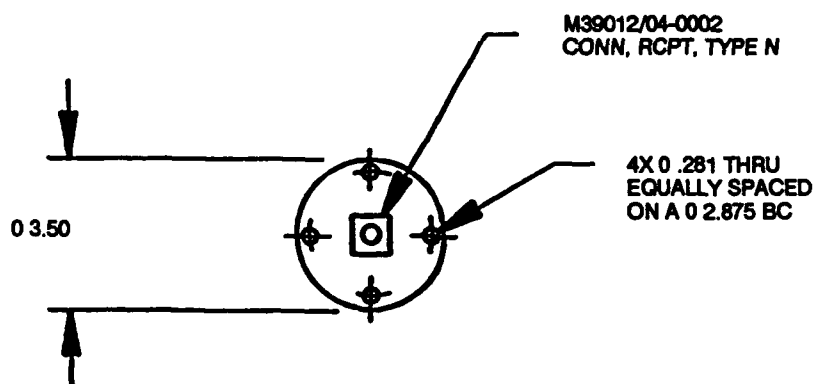
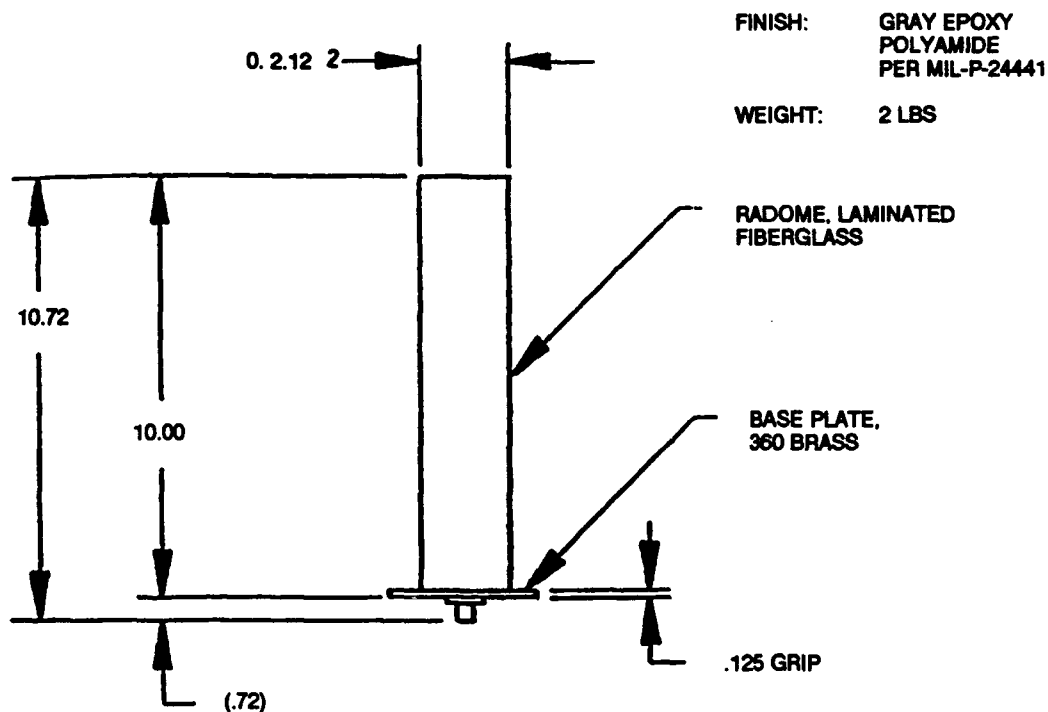
- a. Signal Name: JTIDS RF Power (Receive)
- b. Signal From/To: Antenna to JTIDS Receiver/Transmitter
- c. Signal Function: Reception of JTIDS RF Pulses
- d. Signal Characteristics:
- Type: RF Pulse, Unbalanced Coax
- Frequency Range: 960-1215 MHz
- e. Cable Type: (a) Andrew LDF5-50A
(b) RG-214/U
- f. Connector Type: (a) Andrew L45N and L45W
(b) M39012/01-0005
- g. Load Impedance 50 Ohms, nominal
- h. Voltage Standing Wave Ratio: 2.0:1



MODEL NO. CA3627 ASSY PN 44854 - 500

OUTLINE, DIRECTIVE ARRAY ANTENNA ASSY 960-1220 MHz

Figure 1. JTIDS receive shipboard-antenna mechanical overview.

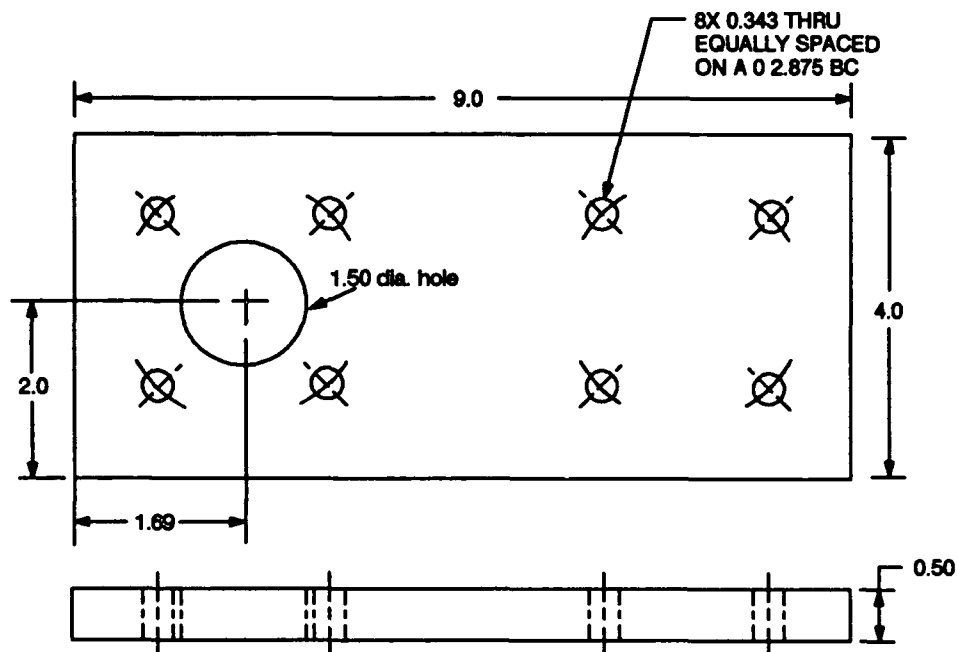


MODEL NO. CA3532 ASSY PN 43094-500

ALL DIMENSIONS ARE IN INCHES
ALL HARDWARE 300 SERIES CRES

OUTLINE, ANTENNA ASSY, OMNI,
960-1220 MHz

Figure 2. JTIDS transmit shipboard-antenna mechanical overview.



- NOTES: A) MATERIAL - 6061-T6 ALUM
ALL DIMENSIONS IN INCHES
B) FINISH - GRAY EPOXY POLYAMIDE
PER MIL-P-24441
C) ROUND CORNERS WITH FILE

Figure 3. Suggested mounting plate.

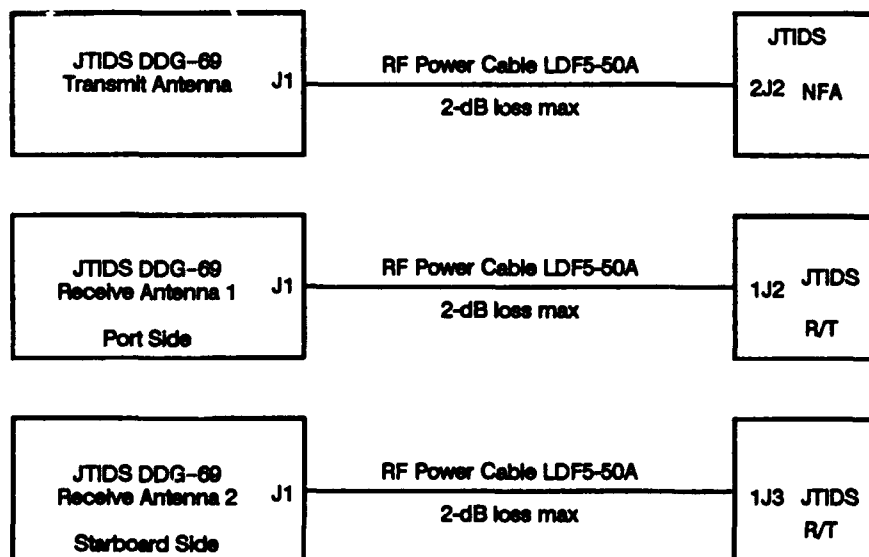


Figure 4. JTIDS DDG-69 shipboard antenna installation.

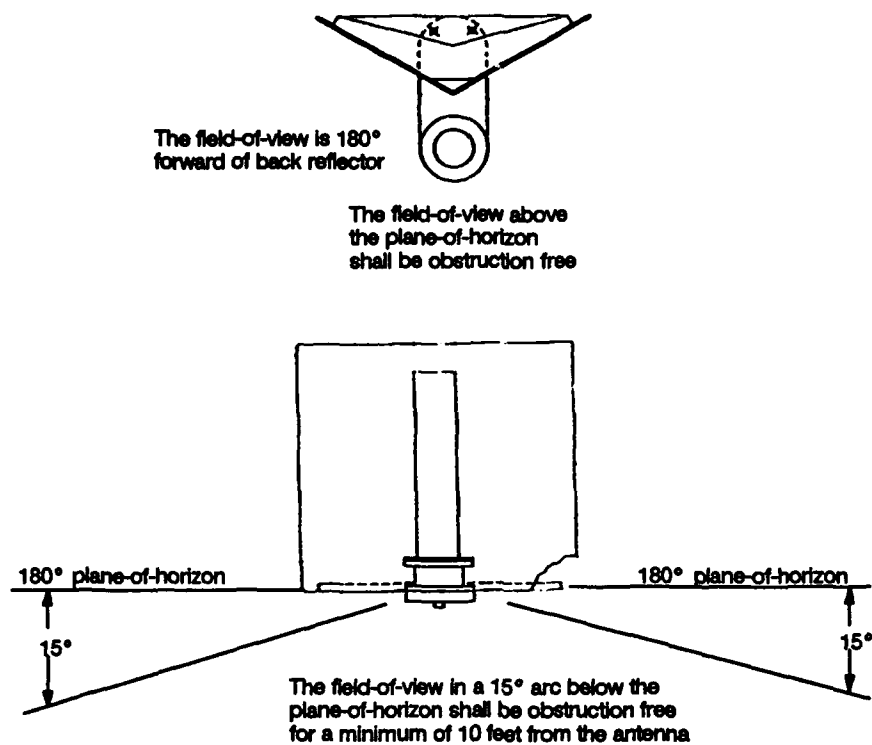


Figure 5. Antenna field-of-view requirements for receive only.

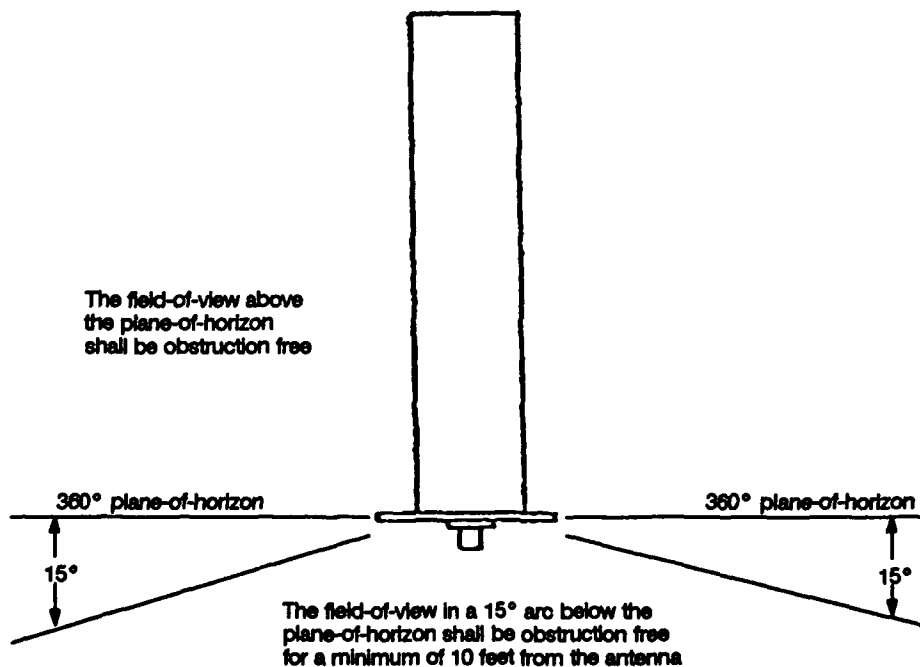


Figure 6. Antenna field-of-view requirements for transmit only.

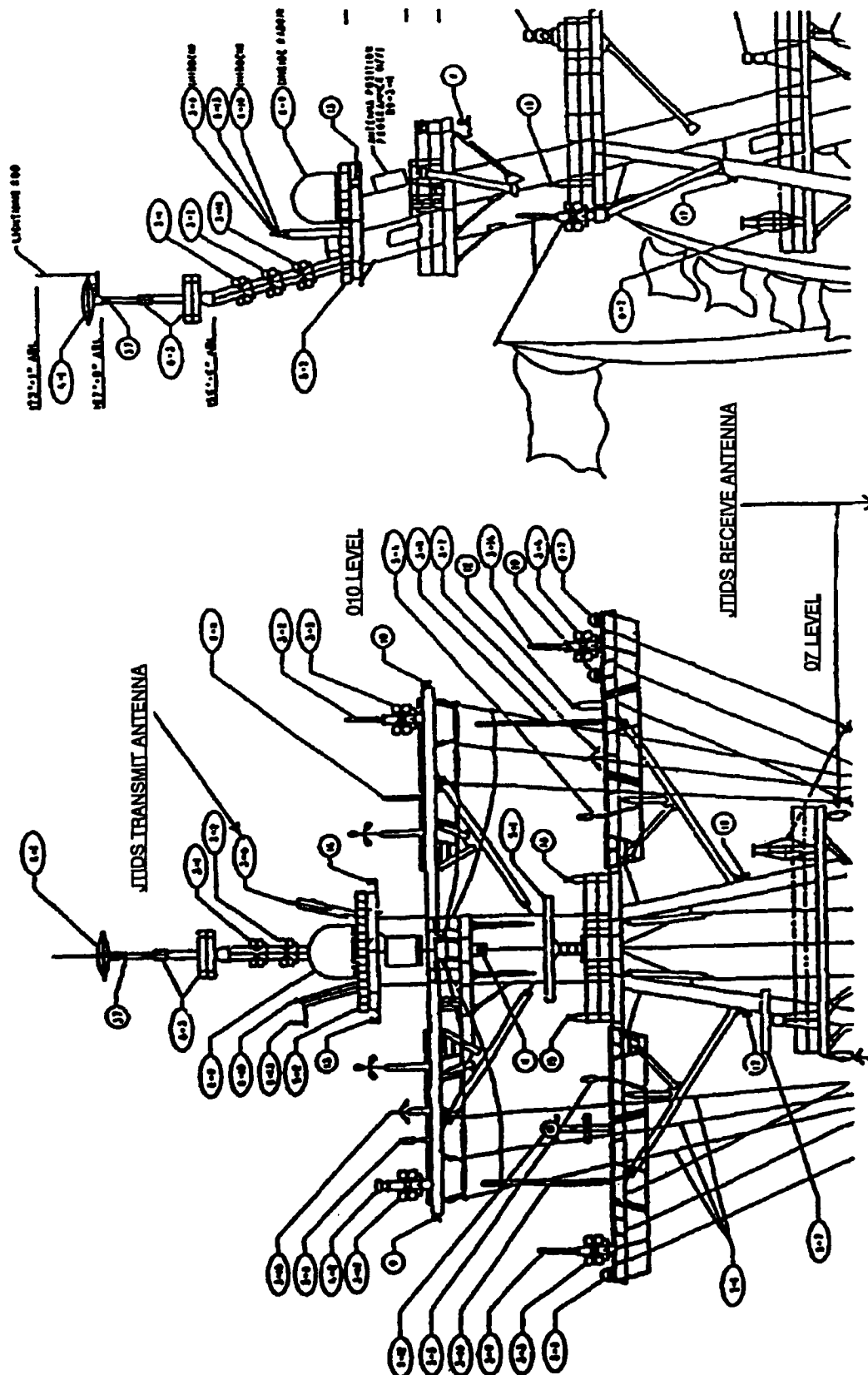


Figure 7. DDG-69 class topside configuration.

Figure 8. JTIDS cable running sheets (1 of 3).

Figure 8. JTIDS cable running sheets (2 of 3).

Figure 8. JTIDS cable running sheets (3 of 3).

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